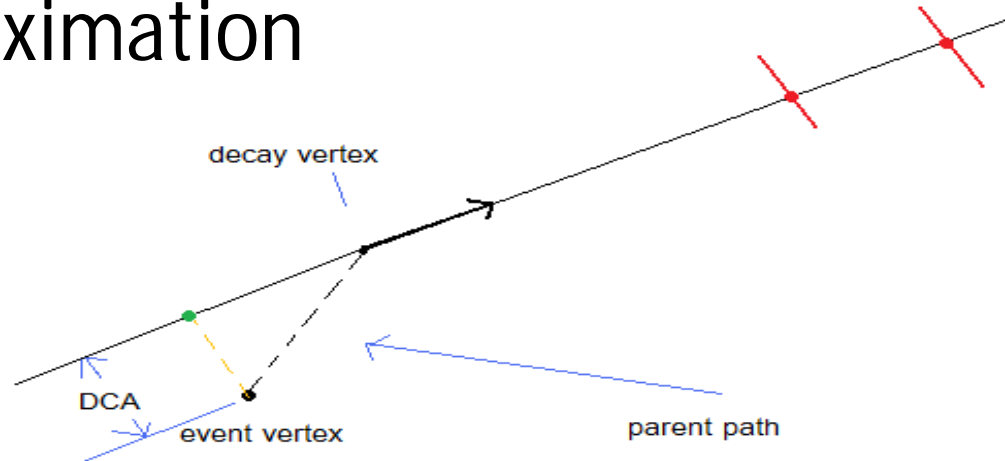# DCA Calculation with the VTX

Richard Petti
StonyBrook University
VTX Software Meeting
10/17/2008

Method

- Calculate the DCA using a straight line approximation
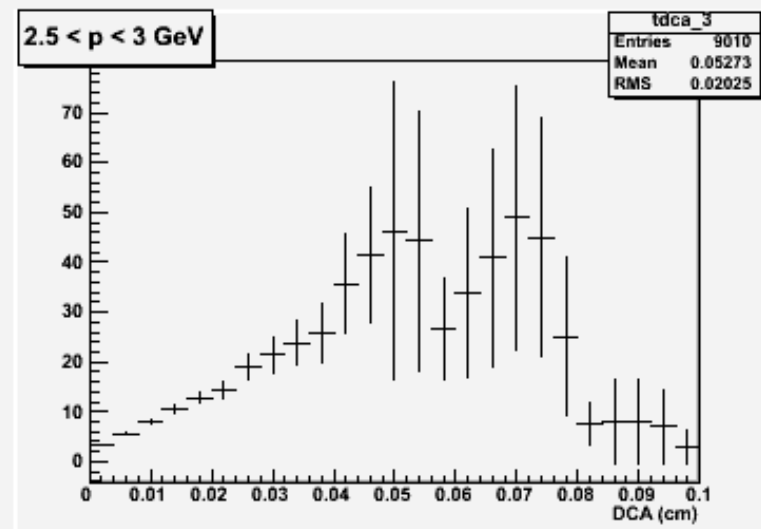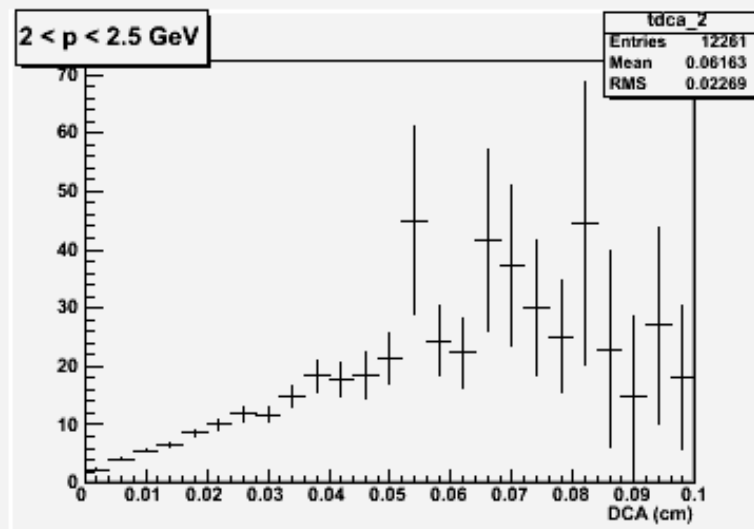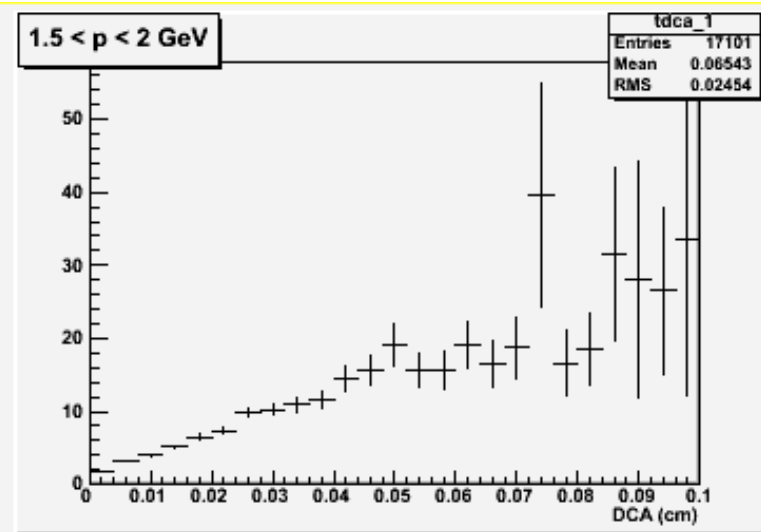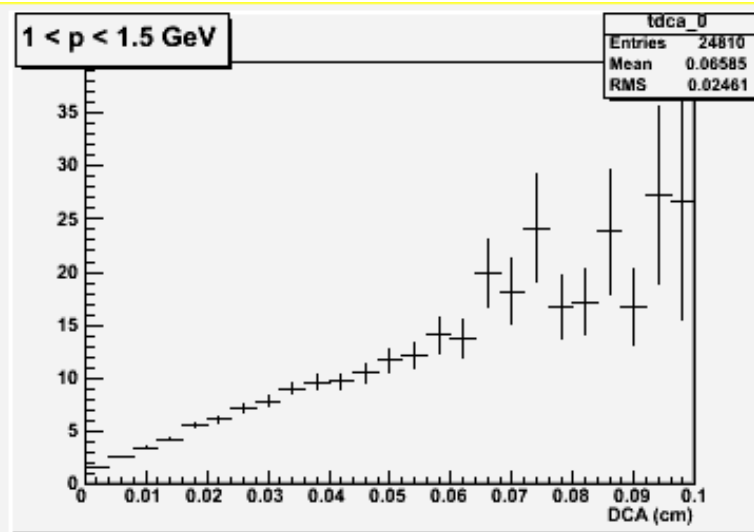

decay vertex

DCA

event vertex

parent path

•What I showed last week was a bug and not really the DCA

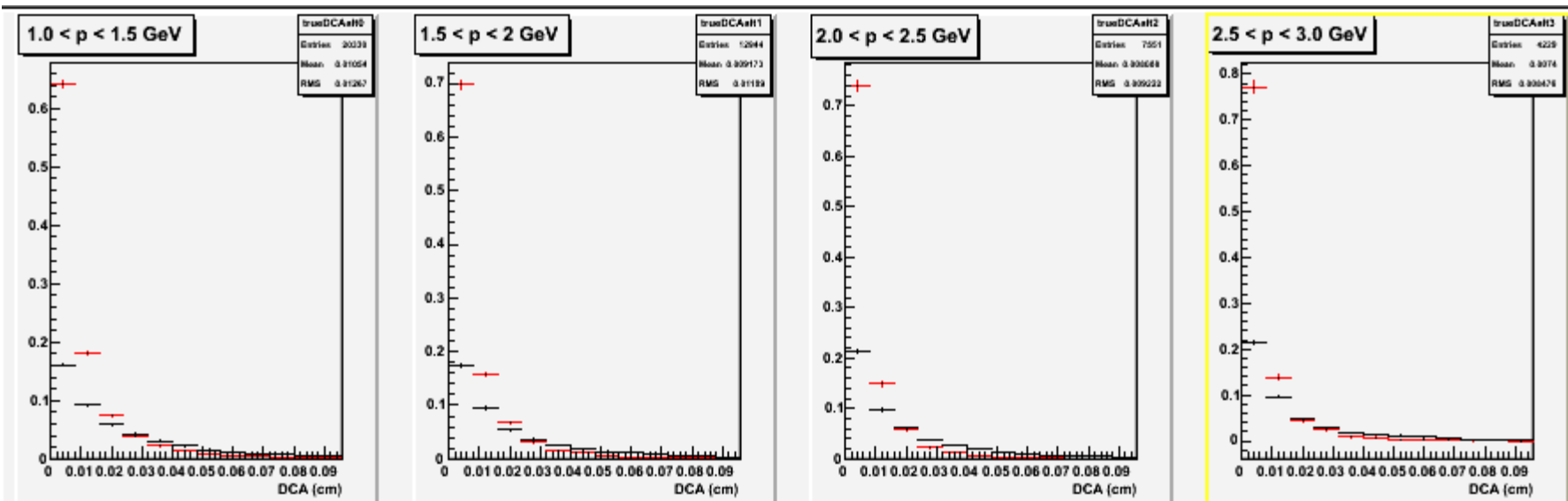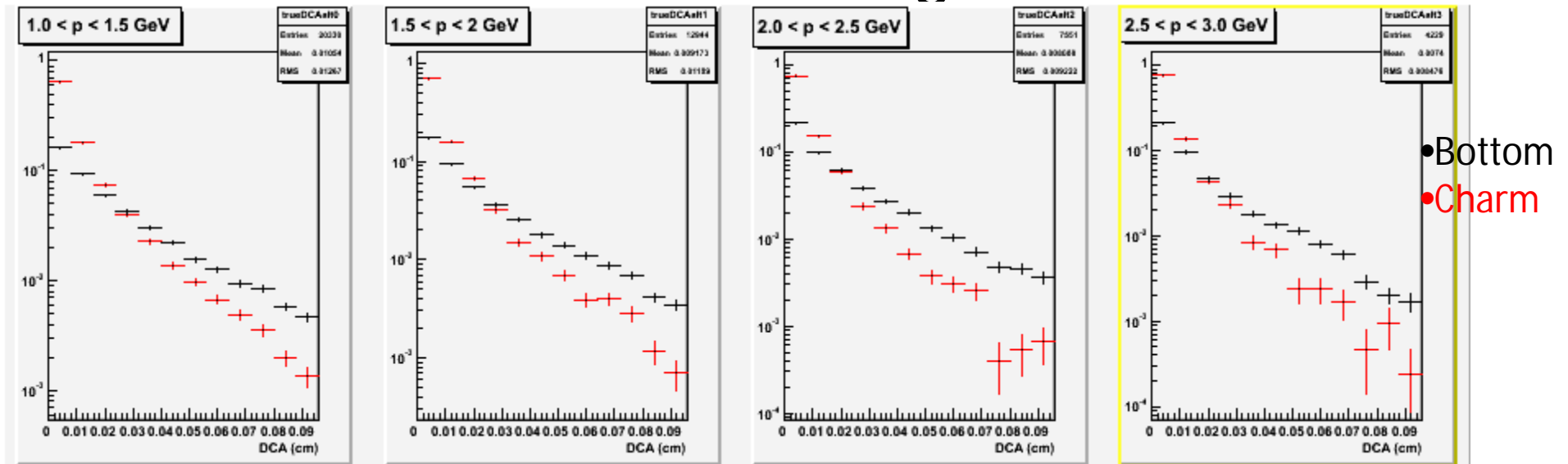•Recently found out that PISA by default takes the vertex of the first particle in the oscar file as the event vertex
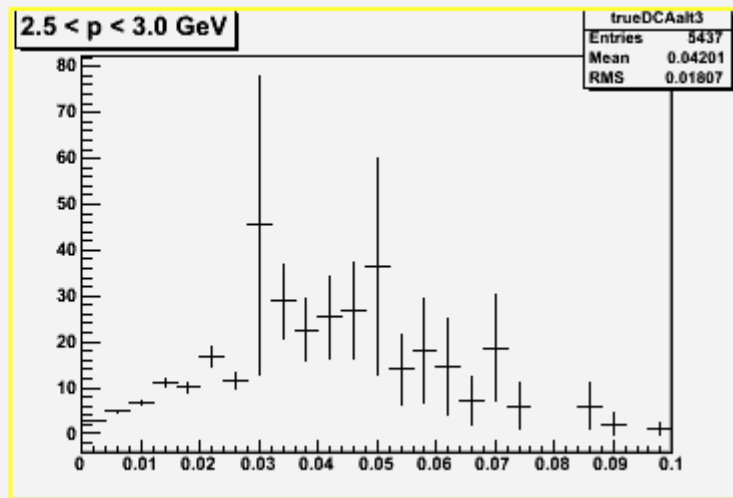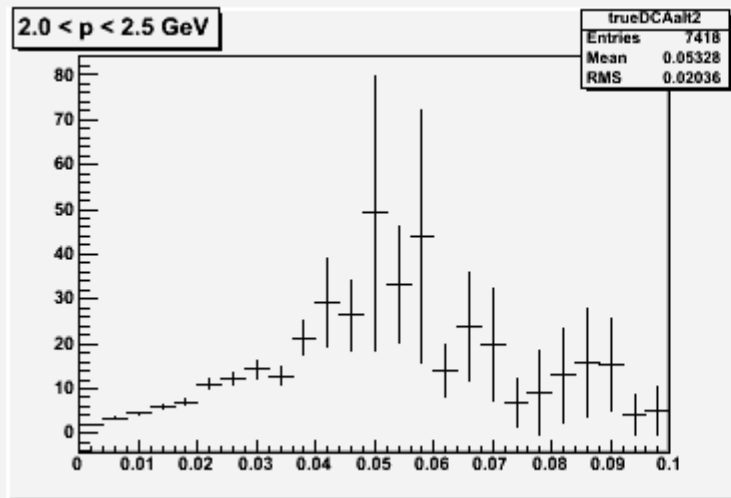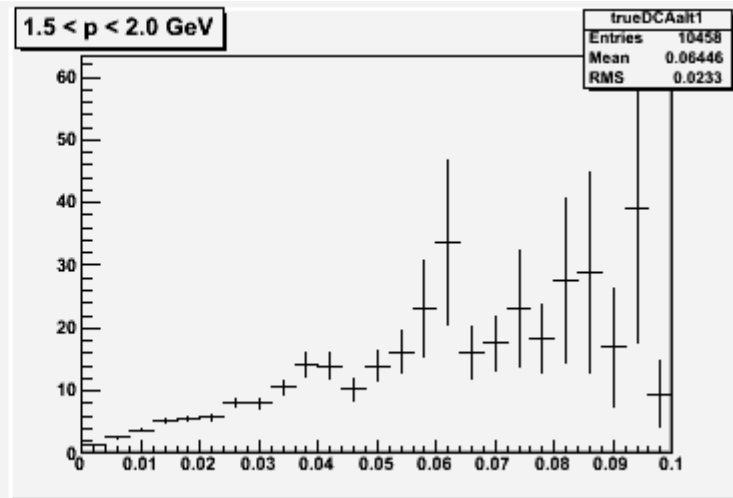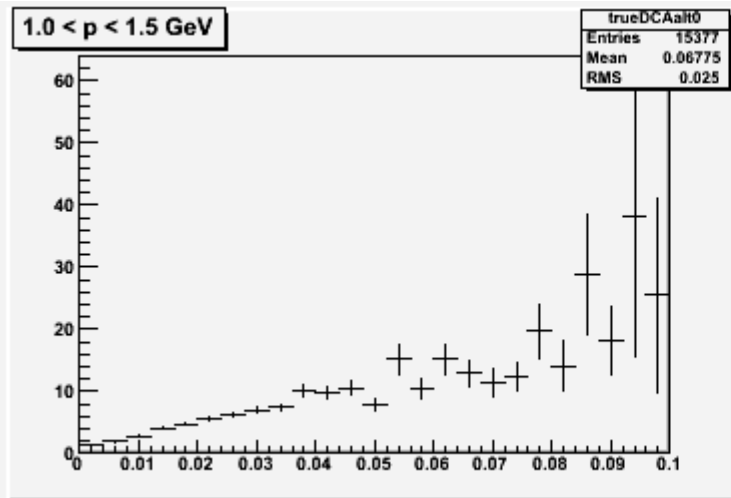
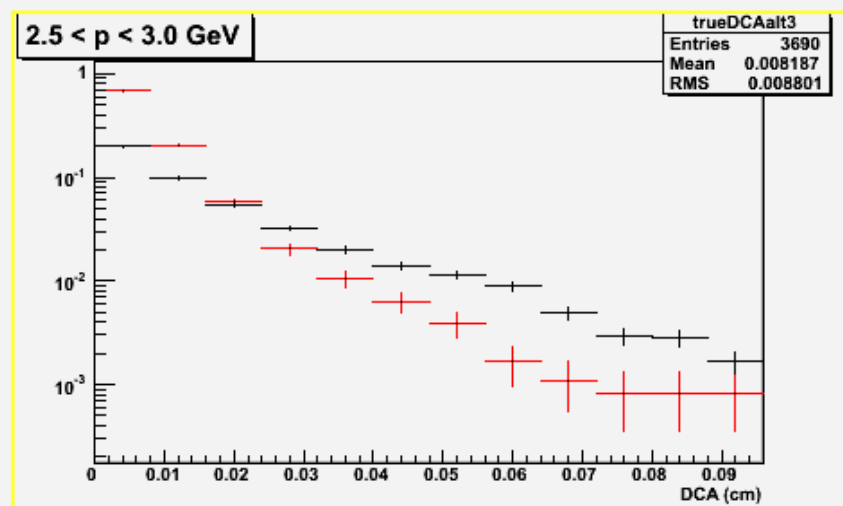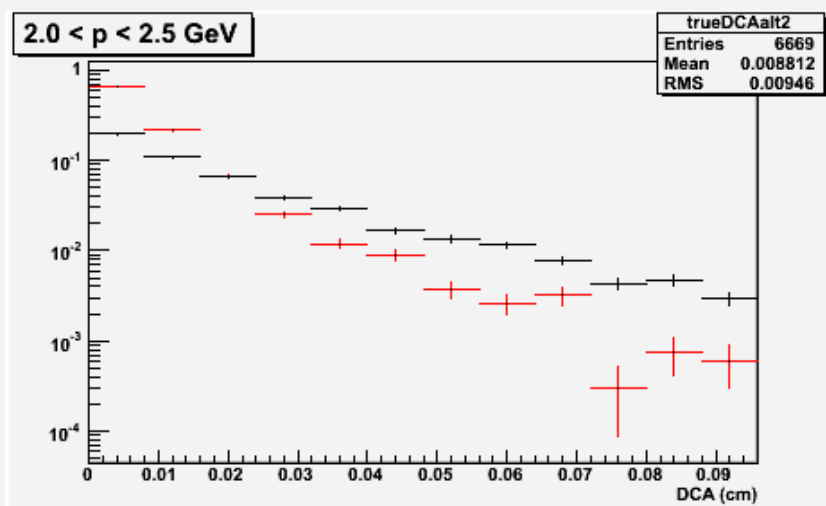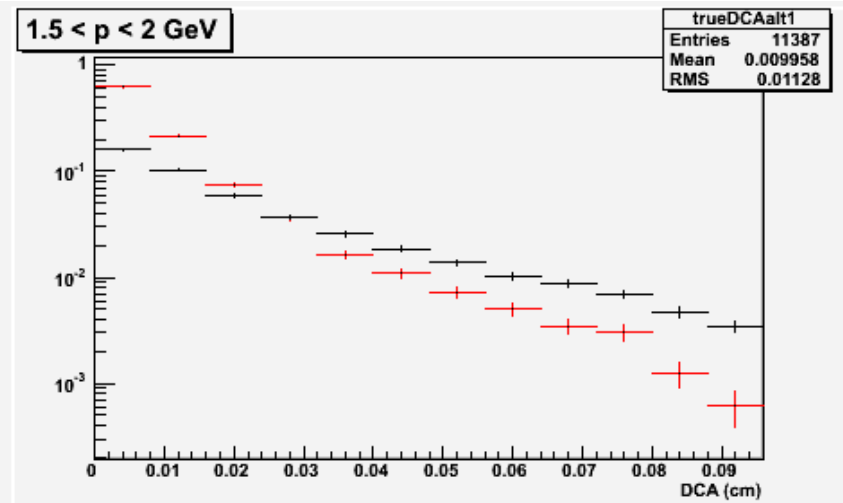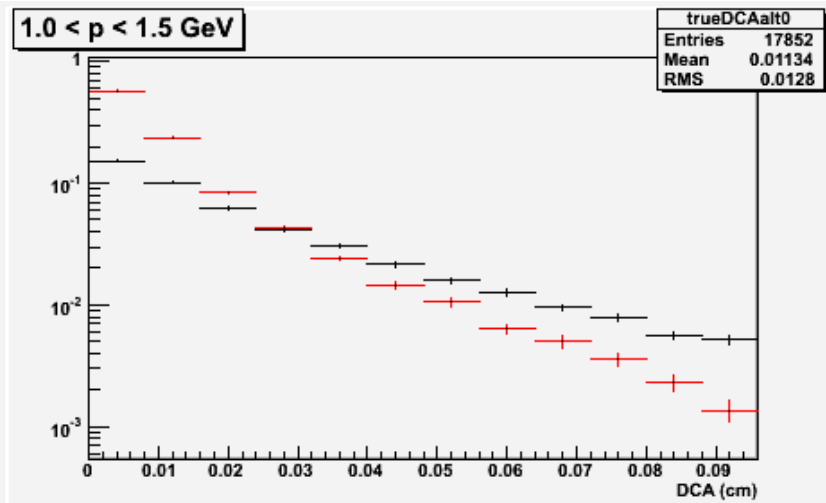# True DCA – Calculating with just the pythia oscar file
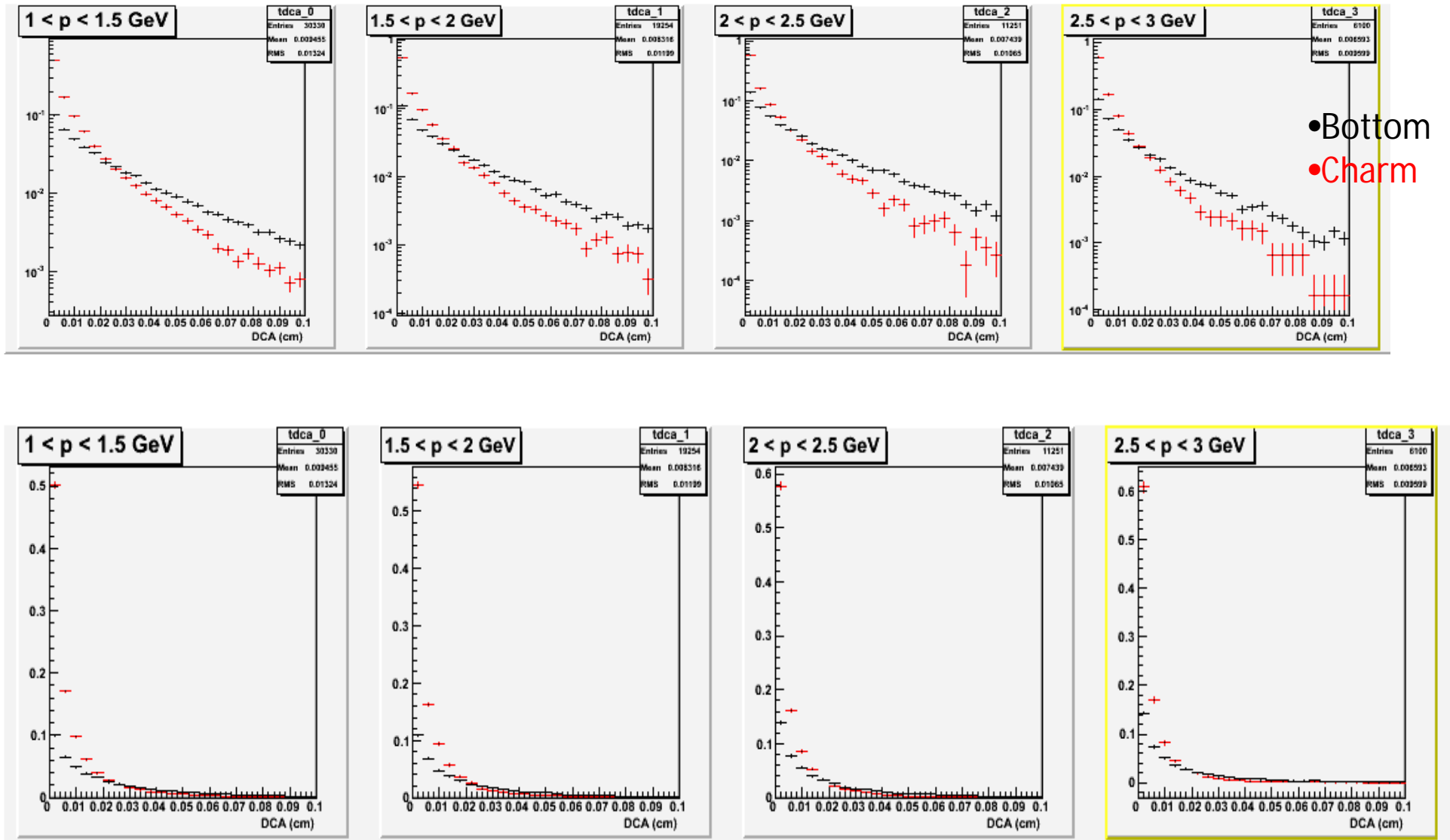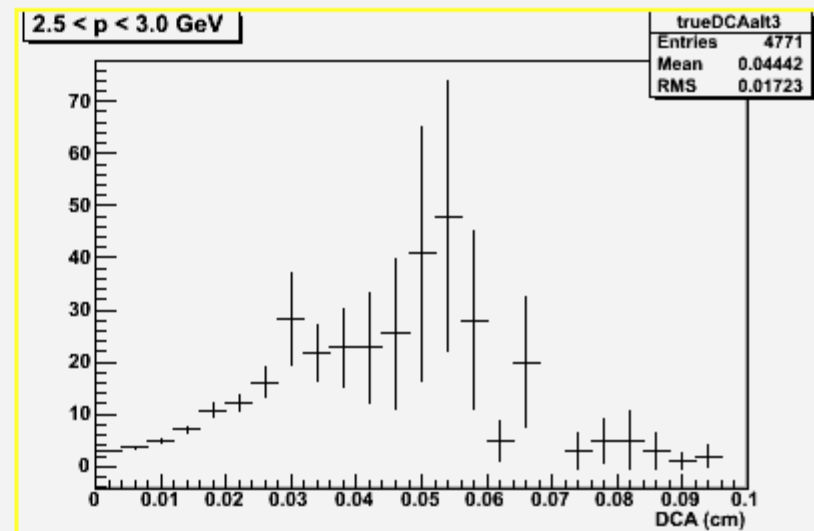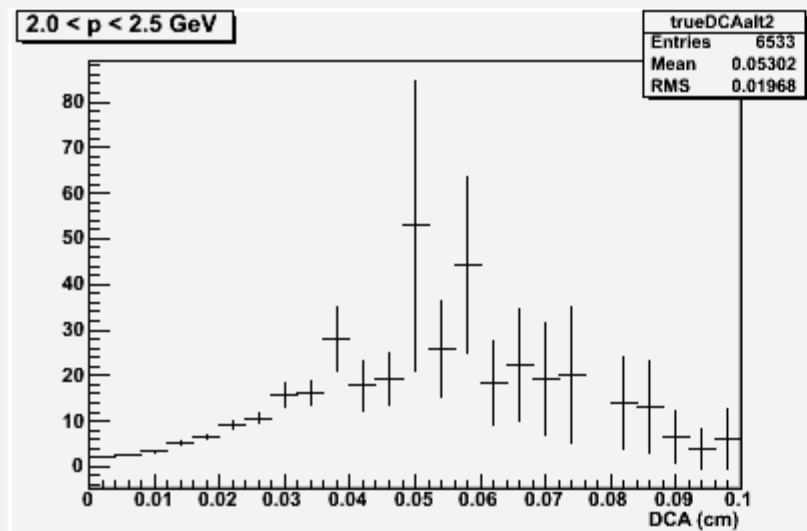
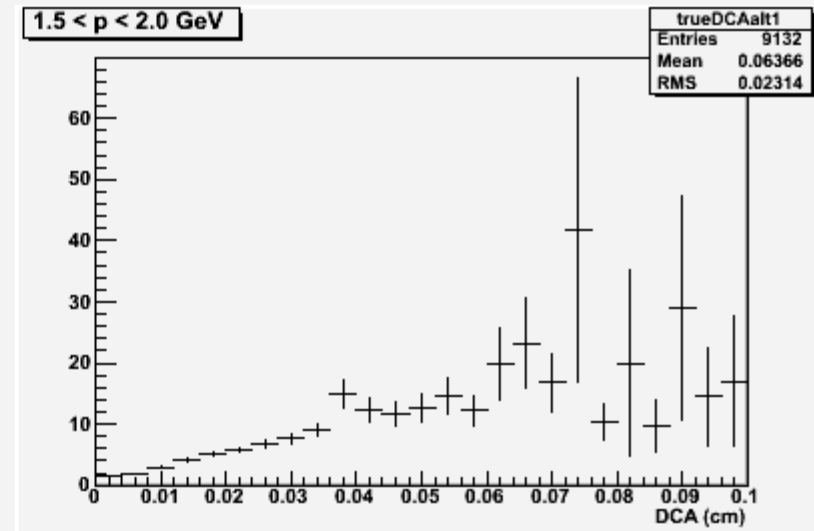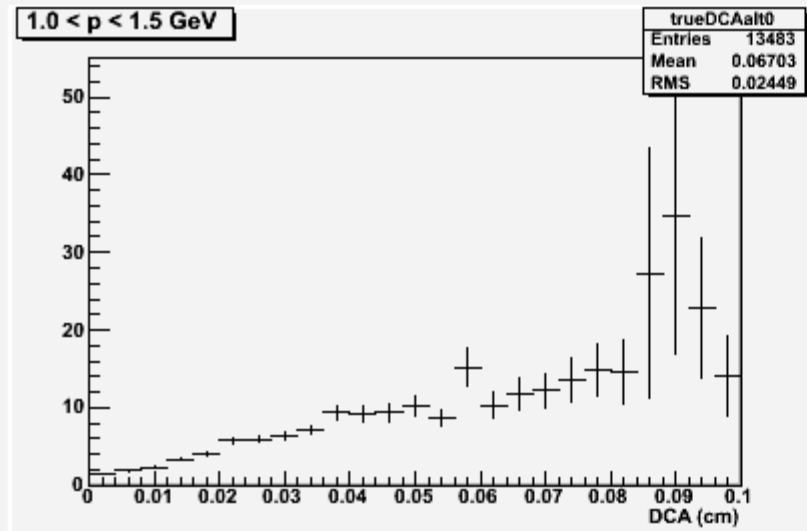# True DCA – Bottom/Charm Ratio

DCA – Ghits and McEvalList for track matching
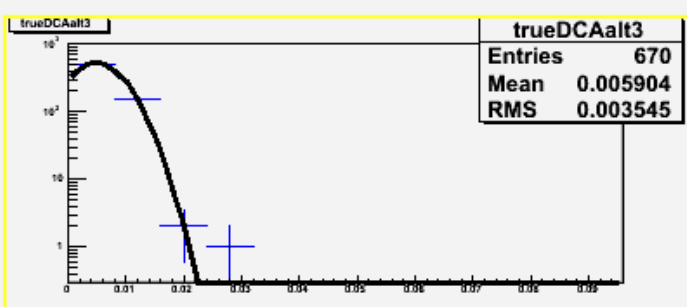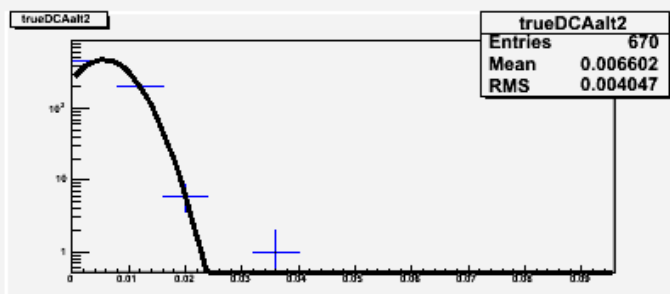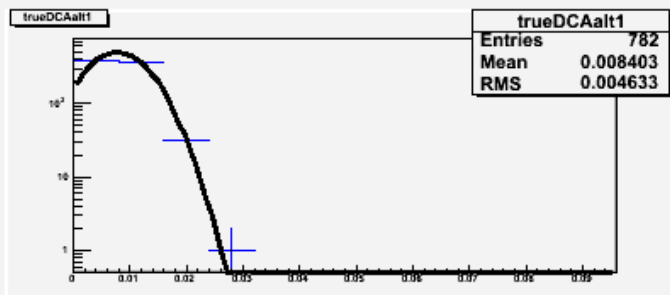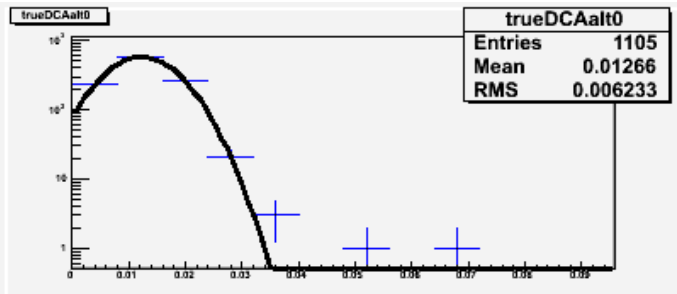
Charm/Bottom Ratio - Ghits

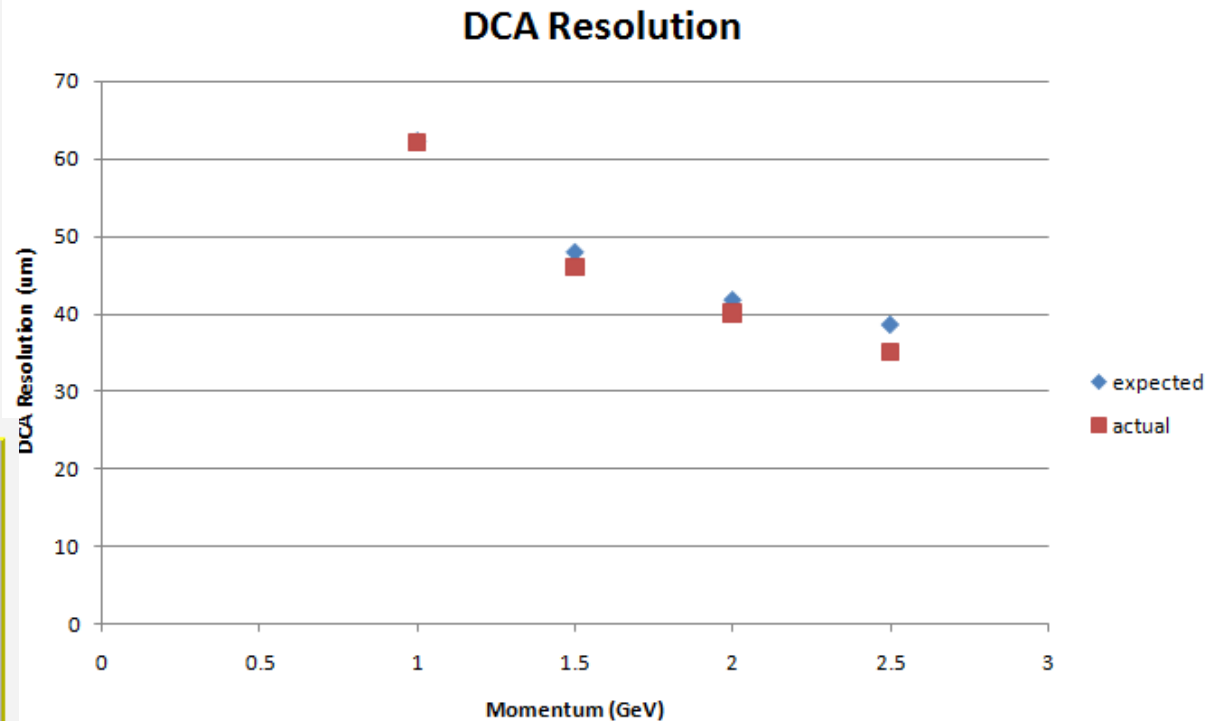# DCA – Clusters and McEvalList track matching

Bottom/Charm Ratio - clusters

DCA Resolution

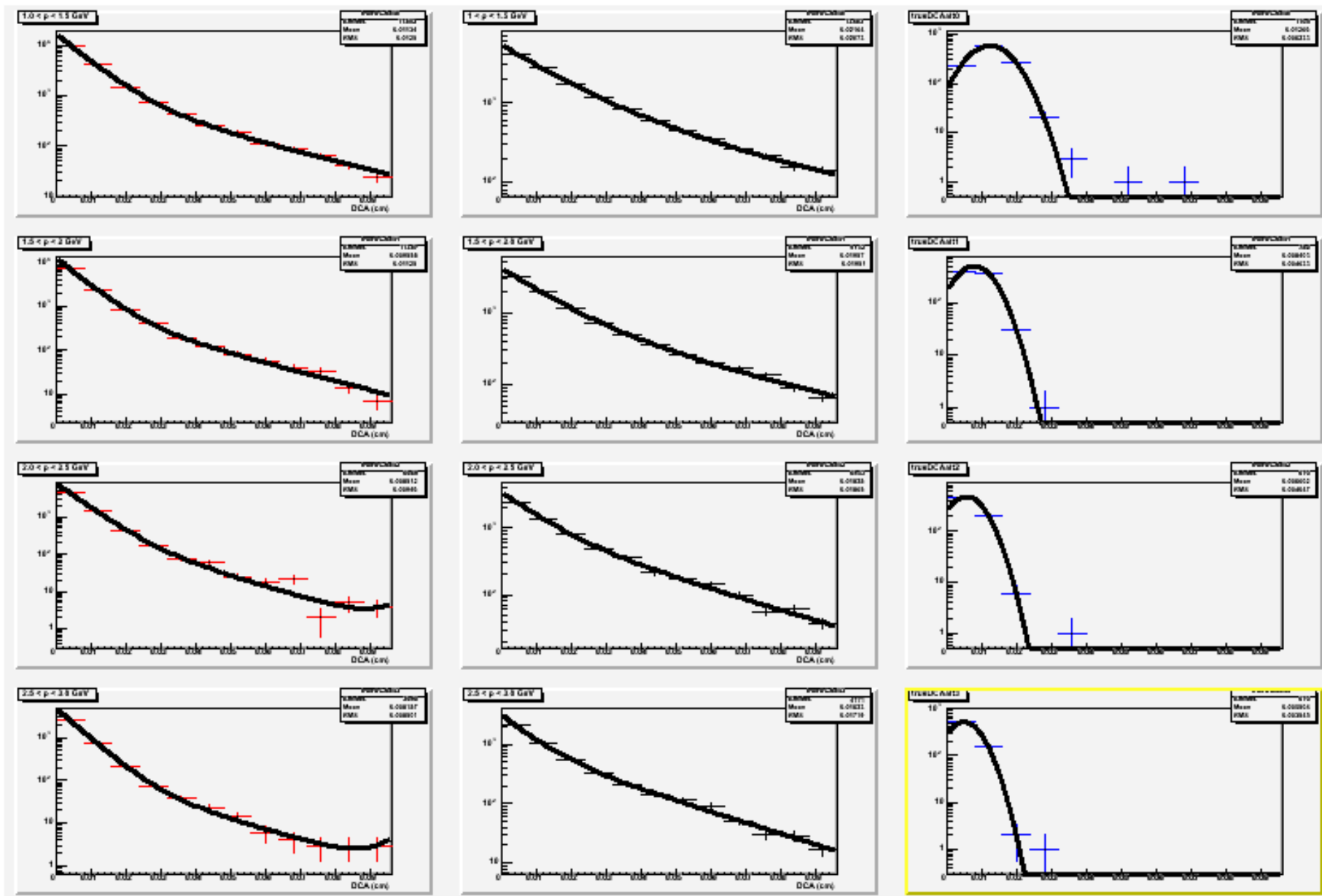•Electrons from vertex

•Expected Resolution

$$\sigma^2_{DCA} \approx \frac{\left(\sigma_1^2 r_2^2 + \sigma_2^2 r_1^2\right)}{(r_2 - r_1)^2} + \theta_{ms}^2 \frac{r_1^2}{\sin^2\theta}$$

To Do List

- Use cgl tracks instead of stand alone tracking for track pattern recognition
  - Stand Alone seems to find many false tracks and is not optimized for tracking particles where the vertex of that particle is not known
- Work on a correction to the straight line approximation to take into account particle bend
- Currently still using the exact event vertex, but will soon run the code while smearing the event vertex
- Work on decomposition of total dca distribution to its individual components

Fits to DCA - Clusters

Decomposition

1 < p < 1.5 GeV